CLAIMS

1. A method for detecting interlace motion artifacts comprising:

a) detecting a presence of multiple vertical frequencies in an image;

b) analyzing relative levels of the presence of multiple vertical frequencies; and

c) deriving an indication of a presence of motion artifacts.

2. The method of claim 1 further comprising:

a) determining an overall measure of image intensity and dynamic range; and

b) compensating the indication of the presence of motion artifacts in areas of low luminosity or contrast.

3. A method for the detection of interlaced motion artifacts comprising:

a) obtaining eight vertically aligned luma data samples;

b) calculating a partial discrete fourier transform for a f_{max} value;

c) calculating a partial discrete fourier transform for a $f_{max}/2$ value; and

d) calculating a partial discrete fourier transform for a $f_{max}/4$ value.

4. The method of claim 3 further comprising:

a) obtaining four vertically aligned luma data samples;

b) calculating a second f_{max} value; and

c) passing the f_{max} value, the $f_{max}/2$ value, the $f_{max}/4$ value and the second f_{max} value though a filter resulting in a filtered f_{max} value, a filtered $f_{max}/2$ value, a filtered $f_{max}/4$ value

and a filtered second f_{max} value.

5. The method of claim 4 wherein the filtered values are obtained by:

a) obtaining a first and second previous f_{max} values, a current f_{max} value and a next and second next f_{max} values;

b) doubling the first previous, current and next f_{max} values;

c) summing the doubled first previous, current and next f_{max} values with the second previous and second next f_{max} value; and

d) dividing the sum by 8.

6. A method for boosting frequency detection values in areas of low brightness and contrast comprising:

a) obtaining a plurality of input pixel data values;

b) determining a maximum value;

c) determining a range value; and

d) selectively boosting a frequency detection value based upon the maximum value, the range value and a plurality of filtered frequency detection values.

7. The method of claim 6 wherein the selective boosting of a frequency detection value comprises:

a) comparing the range value to a first range threshold;

b) comparing the maximum value to a first maximum threshold;

c) multiplying the frequency detection value by a first scale factor if the range value is less than the first range threshold and the maximum value is less than the first maximum threshold; and

d) taking no further action if the range value is less than the first range threshold and the maximum value is less than the first maximum threshold.

8. The method of claim 7 further comprising:

a) comparing the range value to a second range threshold;

b) comparing the maximum value to a second maximum threshold;

c) multiplying the frequency detection value by a second scale factor if the range value is less than the second range threshold and the maximum value is less than the second maximum threshold; and

d) taking no further action if the range value is less than the second range threshold and the maximum value is less than the second maximum threshold.

9. The method of claim 8 further comprising:

a) comparing the range value to a third range threshold;

b) comparing the maximum value to a third maximum threshold;

c) multiplying the frequency detection value by a third scale factor if the range value is less than the third range threshold and the maximum value is less than the third maximum threshold; and

d) taking no further action if the range value is less than the third range threshold and the maximum value is less than the third maximum threshold.

10. A method for the prevention of false detection of interlace motion artifacts comprising:

a) obtaining a plurality of f_{max} frequency detection values;

b) comparing the plurality of f_{max} frequency detection values to a threshold; and

c) adjusting the plurality of f_{max} frequency detection values based upon the comparison.

11. The method of claim 10 wherein the plurality of f_{max} frequency detection values comprises a composite f_{max} frequency detection value, a level-boosted $f_{max}/2$ frequency detection value and a level-boosted $f_{max}/4$ frequency detection value.

12. The method of claim 11 wherein the composite f_{max} frequency detection value is adjusted by:

a) comparing the composite f_{max} frequency detection value to a first low frequency threshold;

b) multiplying a first low frequency scale factor by the level-boosted $f_{max}/2$ frequency detection value and subtracting from the composite f_{max} frequency detection value if the composite f_{max} frequency detection value is less than the first low frequency threshold; and

c) multiplying a second low frequency scale factor by the level-boosted $f_{max}/2$ frequency detection value and subtracting from the composite f_{max} frequency detection value if the composite f_{max} frequency detection value is greater than the first low frequency threshold.

13. The method of claim 12 wherein the composite f_{max} frequency detection value is adjusted by:

a) comparing the level-boosted $f_{max}/4$ frequency detection value to a second low frequency threshold;

b) multiplying a third low frequency scale factor by the level-boosted $f_{max}/4$ frequency detection value and subtracting from the composite f_{max} frequency detection value if the level-boosted $f_{max}/4$ frequency detection value is less than the second low frequency threshold; and

c) multiplying a fourth low frequency scale factor by the level-boosted $f_{max}/4$

frequency detection value and subtracting from the composite f_{max} frequency detection value if the level-boosted $f_{max}/4$ frequency detection value is greater than the second low frequency threshold.

14. The method of claim 13 further comprising setting the composite f_{max} frequency detection value to zero if the composite f_{max} frequency detection value is less than zero.

15. The method of claim 13 wherein the composite f_{max} frequency detection value is lowpass filtered.

16. The method of claim 15 wherein the lowpass filtering is comprises:

a) obtaining a first and second previous f_{max} values, the composite f_{max} frequency detection value and a next and second next f_{max} values;

b) doubling the first previous, and next f_{max} values;

c) octupling the composite f_{max} frequency detection value;

d) summing the doubled first previous f_{max} value, the doubled next f_{max} value, the octupled f_{max} frequency detection value with the second previous and second next f_{max} value; and

e) dividing the sum by 8.

17. A system for the reduction of interlace motion artifacts by vertical frequency analysis comprising:

a) a four-point partial discrete fourier transform module responsive to a set of four vertically aligned luma data sample inputs selected from and approximately centered about a set of eight vertically aligned luma data sample inputs and operative to develop a first frequency detection value;

b) an eight-point partial discrete fourier transform module responsive to the set of eight vertically aligned luma data sample inputs and operative to develop a second, third and fourth frequency detection value;

c) a dynamic range/maximum detection module responsive to the set of eight vertically aligned luma data sample inputs in conjunction with pixel data from a two-dimensional array surrounding a current input pixel and operative to develop a maximum data value and a range value;

d) a horizontal lowpass filter module responsive to the first, second, third and fourth frequency detection values and operative to develop filtered first, second, third and fourth frequency detection values;

e) a detection value boost module responsive to the filtered first, second, third and fourth frequency detection values, the maximum data value and the range value, operative to develop a level boosted four-point f_{max} frequency detection value, a level boosted eight-point f_{max} frequency detection value, a level boosted $f_{max}/2$ frequency detection value and a level boosted $f_{max}/4$ frequency detection value;

f) an averaging module responsive to the level boosted four-point frequency detection value and the level boosted eight-point frequency detection value, operative to develop a numeric average;

g) a threshold comparison/level correction module responsive to the numeric average, the level boosted $f_{max}/2$ frequency detection value and the level boosted $f_{max}/4$ frequency detection value, operative to develop a level-corrected f_{max} frequency detection value;

h) a horizontal weighted average module responsive to the level-corrected f_{max} frequency detection value and operative to develop a center-weighted horizontal frequency detection value; and

i) a threshold adjust module responsive to the center-weighted horizontal frequency detection value and operative to develop a final frequency detection value.